

What is claimed is:

[Claim 1] 1. A composition comprising
a water-borne polymer;
a metal cross-linking agent; and
a stabilizing agent comprising from 2 to 10 carbon atoms and at least two functional groups independently selected from hydroxy and carboxy, wherein the amount of stabilizing agent is 1.4 mole percent or more of the amount of cross-linking agent.

[Claim 2] 2. The composition of claim 1 wherein the water-borne polymer is an emulsion polymer or a water-soluble resin.

[Claim 3] 3. The composition of claim 1 wherein the water-borne polymer comprises an acrylic, vinyl, acrylic/vinyl, polyurethane, polyamide, polyester, polyethylene glycol, SBR polymer, nitrocellulose, hybrid thereof, or blend thereof.

[Claim 4] 4. The composition of claim 3 wherein the water-borne polymer comprises polymerized monomers selected from one or more of acrylic acid, methacrylic acid, itaconic acid, maleic acid, fumaric acid, crotonic acid, acrylic anhydride, methacrylic anhydride, itaconic anhydride, maleic anhydride, fumaric anhydride, crotonic anhydride, styrene, methyl styrene, alpha-methyl styrene, ethyl styrene, isopropyl styrene, tertiary-butyl styrene, ethyl methacrylate, methyl methacrylate, butyl acrylate, butyl methacrylate, 2-ethylhexyl acrylate, ethyl acrylate, vinyl acetate, methyl acrylate, acyclic conjugated dienes, 2-hydroxyethyl methacrylate, 2-hydroxyethyl acrylate, methylol acrylamide, glycidyl acrylate, glycidyl methacrylate, vinyl esters, vinyl chloride, diacetone

acrylamide, acetoacetoxyethyl methacrylate, acetoacetoxyethyl acrylate, allyl acetoacetate, vinyl acetoacetate, acrolein, formylstyrol, vinyl methyl ketone, vinyl ethyl ketone, vinyl butyl ketone, diacetone acrylate, acetonyl acrylate, diacetone methacrylate, 2-hydroxypropyl acrylate acetylacetate, or butanediol-1,4-acrylate acetylacetate.

[Claim 5] 5. The composition of claim 3 wherein the water-borne polymer comprises an acrylic/styrene polymer.

[Claim 6] 6. The composition of claim 1 wherein the water-borne polymer has an acid number of 20 to 400.

[Claim 7] 7. The composition of claim 1 wherein the metal cross-linking agent comprises Zr, Ti, Hf, Cr, Zn, Al, or a mixture of any two or more thereof.

[Claim 8] 8. The composition of claim 7 wherein the metal cross-linking agent comprises Zr.

[Claim 9] 9. The composition of claim 7 wherein the metal cross-linking agent is a salt or complex of ammonia, acetate, propionate, sulfate, carbonate, nitrate, phosphate, tartrate, acetylacetonate, or a mixture of any two or more thereof.

[Claim 10] 10. The composition of claim 1 wherein the metal cross-linking agent is ammonium zirconium carbonate.

[Claim 11] 11. The composition of claim 1 wherein the water-borne polymer comprises carboxylate groups and has a molar ratio of carboxylate to Zr of from about 10:1 to about 1:2.

[Claim 12] 12. The composition of claim 11 wherein the molar ratio of carboxylate to Zr is about 4:1 to about 1:1.

[Claim 13] 13. The composition of claim 1 wherein the stabilizing agent is a diol, hydroxy acid, diacid or sugar, or a mixture of two or more thereof.

[Claim 14] 14. The composition of claim 13 wherein the stabilizing agent is selected from tartaric acid, gluconic acid, mucic acid, saccharic acid, oxalic acid, glycolic acid, lactic acid, malic acid, citric acid, mandelic acid, malonic acid, maleic acid, succinic acid, glutaric acid, a salt thereof, or a mixture of two or more thereof.

[Claim 15] 15. The composition of claim 13 wherein the stabilizing agent is mannitol, fructose, glucose, or a mixture of two or more thereof.

[Claim 16] 16. The composition of claim 1 wherein the molar percentage of stabilizing agent to metal crosslinking agent is 2.4 mole percent or more.

[Claim 17] 17. The composition of claim 1 wherein the molar percentage of stabilizing agent to metal crosslinking agent is 3 mole percent or more.

[Claim 18] 18. The composition of claim 1 wherein the molar percentage of stabilizing agent to metal crosslinking agent is 7 mole percent or more.

[Claim 19] 19. The composition of claim 1 wherein the molar percentage of the stabilizing agent to metal crosslinking agent is 7 mole percent to about 50 mole percent.

[Claim 20] 20. The composition of claim 1 further comprising one or more additives selected from surfactants, solvents, leveling agents, rheology agents, waxes, buffering agents, dispersing agents, defoaming agents, antifoaming agents, modifying polymers, rewetting agents, biocides, resolubility agents.

[Claim 21] 21. The composition of claim 1 further comprising a buffering agent.

[Claim 22] 22. The composition of claim 1 further comprising a non-ionic surfactant.

[Claim 23] 23. A method of making a composition of claim 1 comprising combining the water-borne polymer, the metal cross-linking agent, and 1.4 mole percent or more of the stabilizing agent based on the molar amount of cross-linking agent.

[Claim 24] 24. An overprint varnish comprising a composition of claim 1.

[Claim 25] 25. An ink comprising a composition of claim 1 and a pigment.

[Claim 26] 26. A paint comprising a composition of claim 1.

[Claim 27] 27. A heat-seal lacquer comprising a composition of claim 1.

[Claim 28] 28. A method of preparing a film or coating comprising applying a composition of claim 1 as a film or coating to a substrate.

[Claim 29] 29. The method of claim 28 wherein the substrate is paper, wood, plastic, or textile.

[Claim 30] 30. The method of claim 28 wherein the substrate is a polyethylene film.

[Claim 31] 31. The coating produced by the method of claim 28.

[Claim 32] 32. A composition comprising
a water-borne polymer;
a metal cross-linking agent; and
a stabilizing agent comprising from 2 to 10 carbon atoms and at least two functional groups independently selected from hydroxy and carboxy, wherein the amounts of stabilizing agent and cross-linking agent are sufficient to render a coating comprising the composition more resistant to abrasion than a coating comprising the composition without the metal cross-linking agent after storage of the composition at 40 °C for 5 days.

[Claim 33] 33. The composition of claim 32 further comprising a pigment.

[Claim 34] 34. A composition comprising
a water-borne polymer;
a metal cross-linking agent; and
a stabilizing agent comprising from 2 to 10 carbon atoms and at least two functional groups independently selected from hydroxy and carboxy, wherein the viscosity of the composition is less than or equal to three times its initial value after storage of the composition at 40 °C for 30 days.

[Claim 35] 35. The composition of claim 34 further comprising a pigment.